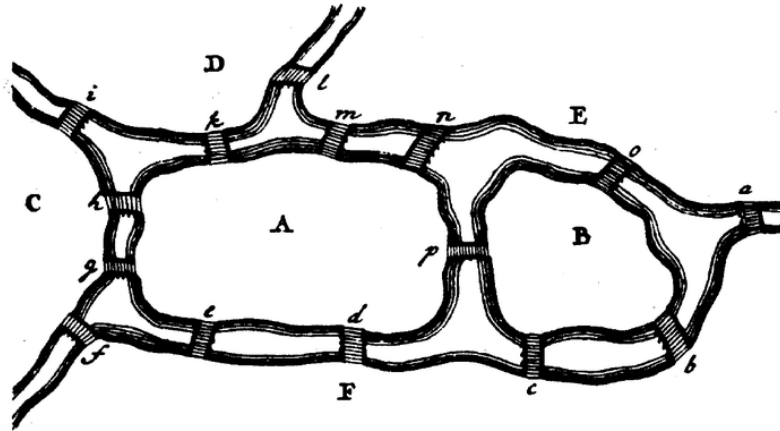
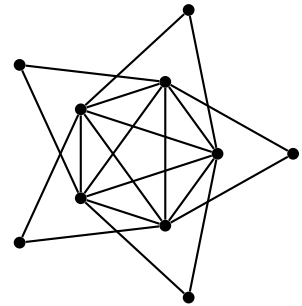


1. Euler also considered the following more complicated version of the Bridges of Königsberg problem. This map shows fifteen different bridges across a river that splits the land into islands A, B, and land C, D, E, and F.



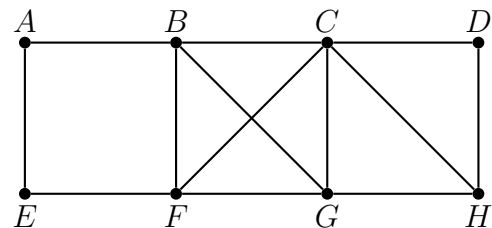
- (a) Draw a graph that represents this map.
- (b) What are the degrees of each vertex?
- (c) Does the graph have a Euler path? If so, give an example. If not, explain why not.
- (d) Does the graph have a Euler circuit (i.e., a path that starts and ends at the same vertex)? If so, give an example. If not, explain why not.

2. Does the graph below have an Euler path? How can you tell? Would the answer change if there was a vertex everywhere two edges cross?



3. Use the Handshake Theorem to explain why a graph cannot have an odd number of odd degree vertices. Hint: What is the sum of an odd number of odd numbers? What about the sum of an even plus an odd number?

4. Consider the graph below.



- (a) What are the only vertices where an Euler path can start or finish?

- (b) Find an Euler path. What order do you visit the vertices in the Euler path?